September 10, 1999

[a55bu160.]

The information in this bulletin is applicable to AKC 55 software versions 0.490 and later. The features and functions covered in this bulletin are:

(1) Configuring and Using Miscellaneous Points [Extensive rewrite.]
(2) Improved Condenser Control
(3) User-configurable Screen
(4) Use of CPC Sensor Model CPC501-1121

(1) Configuring and Using Miscellaneous Points

Important Upgrade Note

Note: When updating from earlier versions of AKC 55 software to version 0.490 or later, you must reconfigure all miscellaneous Relay Outputs.

Whenever you need to create a custom control strategy or define an input not available through refrigeration, HVAC, or lighting configuration, you will need to configure one or more miscellaneous points.

Users can custom configure miscellaneous points up to the following limits:

Type of Point	Maximum Number
Relay Output	40
On/Off Input	40
Sensor Input	40
Variable Output	20
Conversion Factor	10

Relay output strategy is very flexible. There can be up to three conditions, each of which can be operated on one of the following:

A Sensor Input
A Sensor Comparison
An On/Off Input
Another Relay Output

In addition to the three conditions, each relay output can have a schedule group with up to eight schedules.

It is possible to create complex logic by operating one (or even more) conditions on relay outputs, but you should carefully test the functioning of any such chain of conditions and schedules.

Plan Strategy First

Before beginning configuration, particularly for a relay output, plan your strategy. What types of points, will you need to define? How many? If you need to develop a control strategy involving several inputs, outputs, and schedules, you may wish to read the example at the end of this section first, because it shows how on/off inputs, sensor inputs, schedules, and even other relay outputs, are used to create a custom control strategy for a relay output.

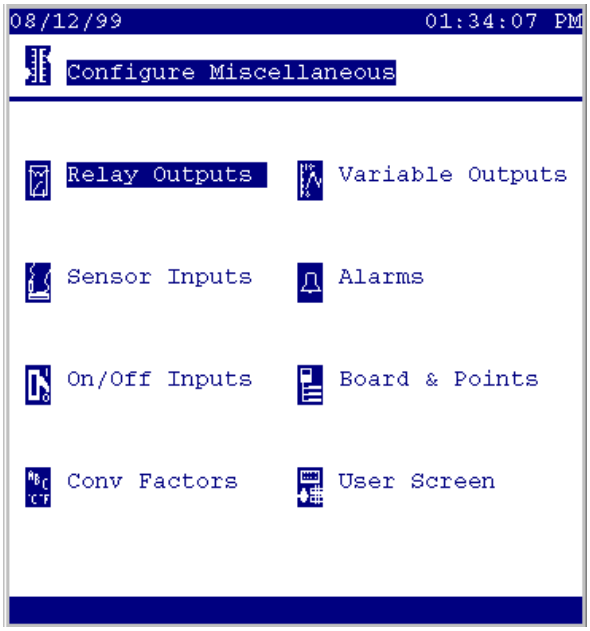
Starting Configuration

The way you begin configuration of a miscellaneous point depends on whether there are any miscellaneous points already configured.

First, select **Misc Points** from the main menu. If no miscellaneous points have been configured yet, you will next see the Configuration Menu. Select **Misc Points** again, and the Configure Miscellaneous Menu appears.

If there are already miscellaneous points configured, the Miscellaneous Points Menu will appear when you select **Misc Points** from the Main Menu. There will be a menu item for each type of point that has been previously configured; there will also be a Configure menu item. Select **Configure**, and the Configure Miscellaneous menu appears.

To start configuration, select Misc Points, Configuration (or Configuration, Misc Points) from the Main Menu. The Configure Miscellaneous menu appears:



You might use a miscellaneous relay output point for an exhaust fan, a dispenser that adds chemicals to an evaporative condenser, an oven, a produce fogger, or any other device that can't or shouldn't be treated like an ordinary refrigeration, HVAC, or lighting point.

Miscellaneous on/off inputs and sensor inputs can be used in defining the strategy for miscellaneous relay outputs or for other outputs in the system. They may be monitored for history, and may be configured strictly for that purpose, or for alarms. Alarms can be created for any miscellaneous point. For sensor inputs, the AKCESS system allows custom conversion for non-Danfoss sensors that have a linear response.

Configuring Miscellaneous Sensor Inputs

You can configure up to 40 miscellaneous sensor inputs per AKC 55. To configure a miscellaneous sensor input, select **Sensor Inputs** from the Configure Miscellaneous menu. When the Configure Sensor Inputs menu appears, enter the number of sensor inputs you want to configure. Then, edit the name, choose whether the point is to be broadcast or not, assign a board and point, and select the type of sensor to complete configuration. The editing can also be done in the Board & Points screen, selectable from the Configure Miscellaneous menu.

Configuring Miscellaneous On/off Inputs

You can configure up to 40 miscellaneous on/off inputs per AKC 55. Configuration proceeds in a manner similar to that for sensor inputs except that you must select whether you wish the input to read on when it senses voltage or no voltage. Editing can also be done in the Board & Points screen, selectable from the Configure Miscellaneous menu.

Alarms for miscellaneous points are covered at the end of this section.

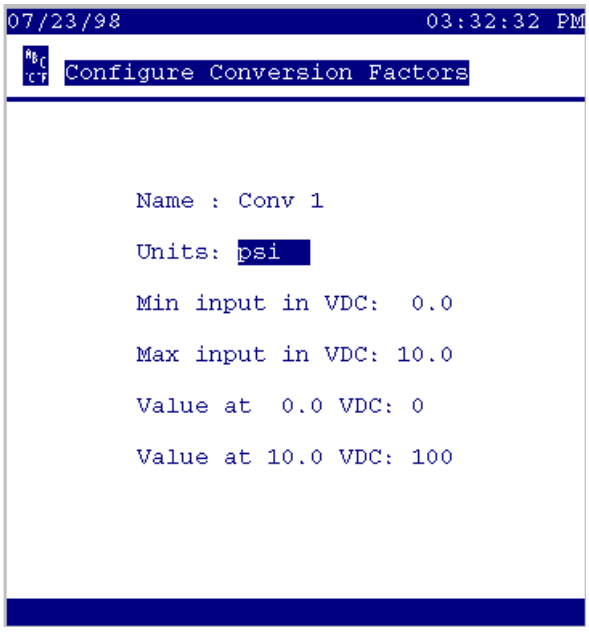
Configuring Miscellaneous Variable Outputs

You can configure up to 20 miscellaneous variable outputs per AKC 55. To configure a miscellaneous variable output, select Variable Outputs from the Configure Miscellaneous menu.

Specifying Miscellaneous Conversions

Miscellaneous conversions are used for sensors which have an output range or range-to-value relationship not already defined as one of the named “types” that can be selected when configuring a sensor input. To configure a miscellaneous conversion, select **Conv Factors** from the Configure Miscellaneous menu. The Configure Conversion Factors screen appears:

Enter the number of conversions; if you are adding to conversions already configured, simply change the existing number to a higher number. For any new sensor, the default name (Conv 1, Conv 2, etc.) will appear, with a **Setup** button to the right. It is a good idea to change the name from the default to something which relates to the sensor use or type. These names will be included in the list from which you select the “Type” during sensor configuration. When you select the **Setup** button, the following screen appears:


07/23/98 03:32:32 PM
Configure Conversion Factors
Name : Conv 1
Units: psi
Min input in VDC: 0.0
Max input in VDC: 10.0
Value at 0.0 VDC: 0
Value at 10.0 VDC: 100

The field contents which may be selected, and the range of values for each, are as follows:

Units:	psi, bar, °F, °C, ppm, %
Min input in VDC:	0.0 - 10.0
Max input in VDC:	0.0 - 10.0
Value at [min] VDC:	0 - 999
Value at [max] VDC:	0 - 999

Select the units for the sensor reading, then, from data supplied by the manufacturer, enter the minimum and maximum input voltage and the values which correspond to each.

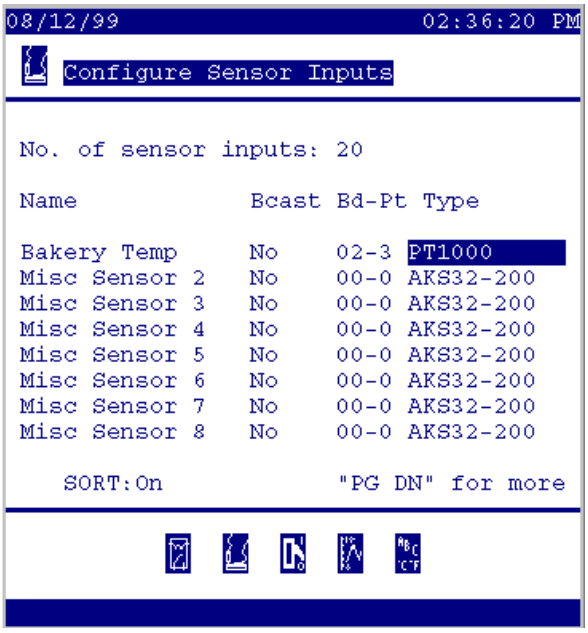
Configuring Miscellaneous Relay Outputs

When the Configure Relay Outputs Menu appears, enter the number of outputs (from 1-40) you wish to configure. If you are adding to points already configured, add to the existing number. You will see additional relays added to the Relay n, where n is a number from 1 to 40.

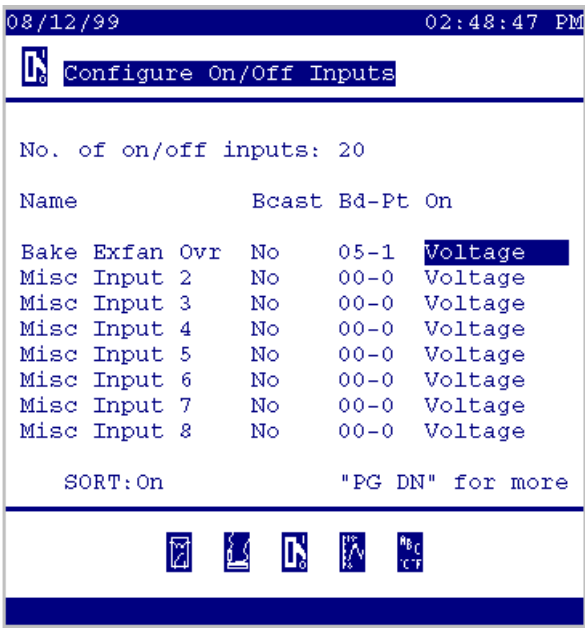
The configuration process will best be understood through an example. Let us say that we want to control a bakery exhaust fan to operate when the bakery is occupied and when the temperature is above 72 °F, but not when a fire warning device is operating. The fire warning device is a rotating strobe light which we can monitor with an on-off input.

From the plan just stated, it can be seen that we will need a relay output for the fan, a schedule for regular bakery hours, and a sensor for bakery temperature. We will install a switch to override the schedule for those unscheduled times when bakery personnel are working. The override switch and the fire strobe monitor will need to be configured as miscellaneous on-off inputs. We will also assume that the bakery temperature sensor must be a miscellaneous point.

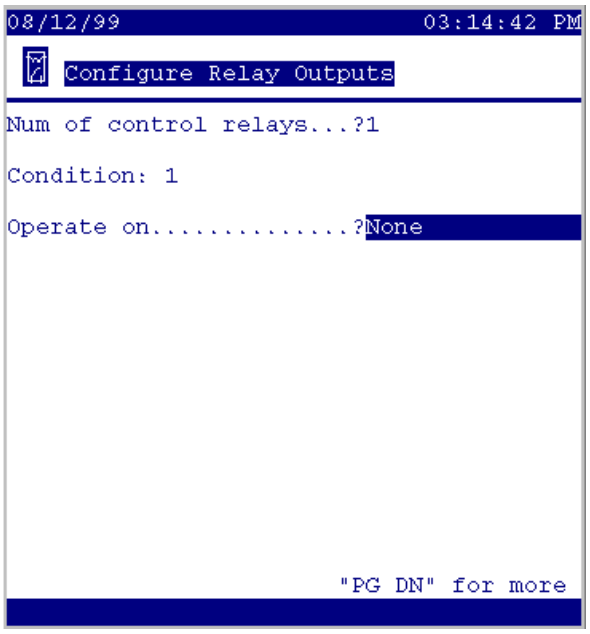
It is good practice to configure all the points on which the logic will be based before configuring the Relay output. We begin with the bakery temperature sensor. From the Configure Miscellaneous Menu, select **Sensor Inputs**.


08/12/99 02:36:20 PM
Configure Sensor Inputs
No. of sensor inputs: 20
Name Bcast Bd-Pt Type
Bakery Temp No 02-3 PT1000
Misc Sensor 2 No 00-0 AKS32-200
Misc Sensor 3 No 00-0 AKS32-200
Misc Sensor 4 No 00-0 AKS32-200
Misc Sensor 5 No 00-0 AKS32-200
Misc Sensor 6 No 00-0 AKS32-200
Misc Sensor 7 No 00-0 AKS32-200
Misc Sensor 8 No 00-0 AKS32-200
SORT:On "PG DN" for more

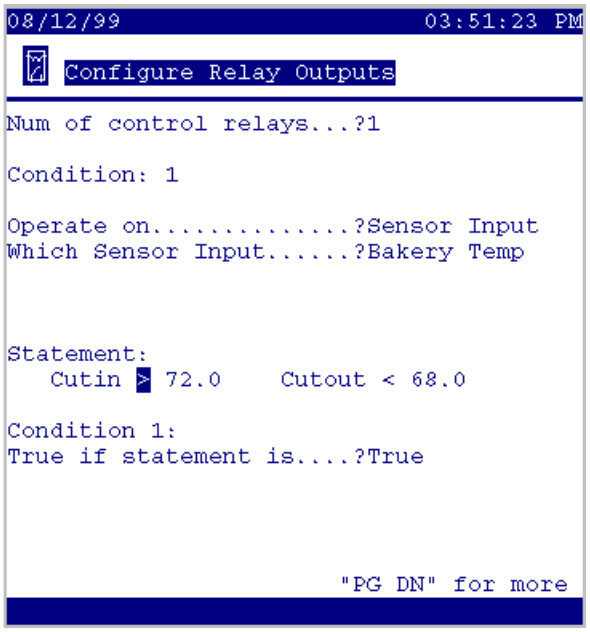
In the picture above, we have already edited the name of the sensor, assigned a board and point, and selected the proper sensor type from the list. Next, we will define the on/off input for the override switch. After going back out to the Configure Miscellaneous Menu, we select **On/Off Inputs**.


08/12/99 02:48:47 PM
Configure On/Off Inputs
No. of on/off inputs: 20
Name Bcast Bd-Pt On
Bake Exfan Ovr No 05-1 Voltage
Misc Input 2 No 00-0 Voltage
Misc Input 3 No 00-0 Voltage
Misc Input 4 No 00-0 Voltage
Misc Input 5 No 00-0 Voltage
Misc Input 6 No 00-0 Voltage
Misc Input 7 No 00-0 Voltage
Misc Input 8 No 00-0 Voltage
SORT:On "PG DN" for more

Here again the editing has been done. Next, we configure the On/Off Input for the fire strobe monitor in the same manner. Now we are ready to configure the Relay Output. From the Configure Miscellaneous Menu, select **Relay Outputs**. When the Configure Relay Outputs screen appears, change the name of one of the miscellaneous relay outputs, then click on the **>Setup<** button. The screen that appears will look like this:



Initially, condition screens for miscellaneous points have **None** in the **Operate on** field. The other selections which can appear in that field are **On/Off Input**, **Sensor Input**, and **Relay Output**. After we select **Sensor Input**, additional fields will appear. In the following illustration the contents of the fields have been edited:



The parts and fields of the screen and their meanings are as follows:

Which Sensor Input The field contains the names of all the configured sensor inputs in the system, plus a **Not Configured** entry which can be used if you have not already configured the input you will be using. We chose to configure all the points we will be using for the logic of our miscellaneous output because the process is less likely to be confusing.

Statement:

The statement for a sensor input always gives a cut-in and cut-out. The values are changeable. The < and > signs are also changeable; whenever one is changed, the other will adjust to provide for a correct range of either the cooling type (>, <) or the heating type (<, >). ***Warning: there is nothing to prevent you from entering values that will not work properly with the comparison symbols chosen. For example, you can enter "Cutin > 50.0 Cutout < 75.0".***

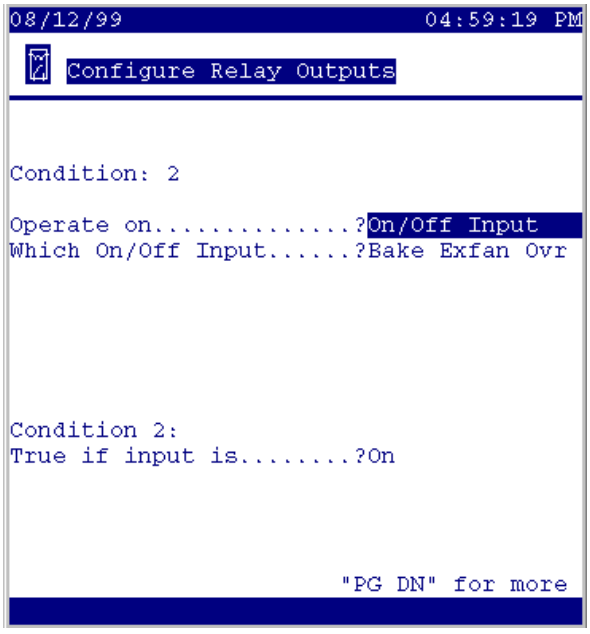
The reason for a four degree difference between cut in and cut out is to avoid the relay output's cycling on and off when the temperature is hovering around the cut in setpoint.

Condition 1
(Truth Test):

In our example, we want the condition to be true if the statement is True. The way we have written the statement, if the temperature is above 72 or if the fan has come on (due to the temperature having reached cut in) and cut out has not been reached, the statement will be true. Since it is under these conditions that we want the fan on, we want the condition to be true if the statement is true.

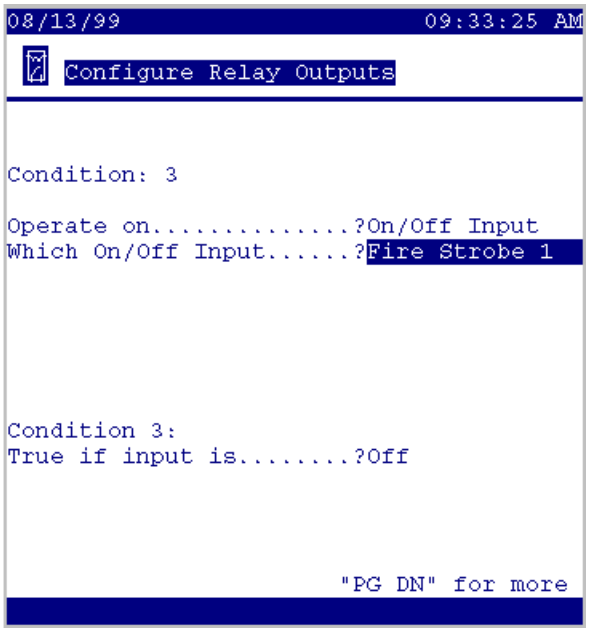
We must adjust the answer field for the question **True if statement is….?** by changing it to **True** or **False** as our strategy requires. Since in this case we want the condition to be true if the "statement" is true, we change the field to **True**.

Now our sensor input condition is complete. Click on **"PG DN"** and the configuration screen for the next condition appears.



The screen fields have been edited so that the condition is based on the override switch, and the condition will be true if the switch is on. Later, we will make sure that the Bakery fan strategy includes logic that will cause the fan to run when either the bakery schedule is true **or** the switch is on.

Now, we click again on "PG DN" and move to condition 3:

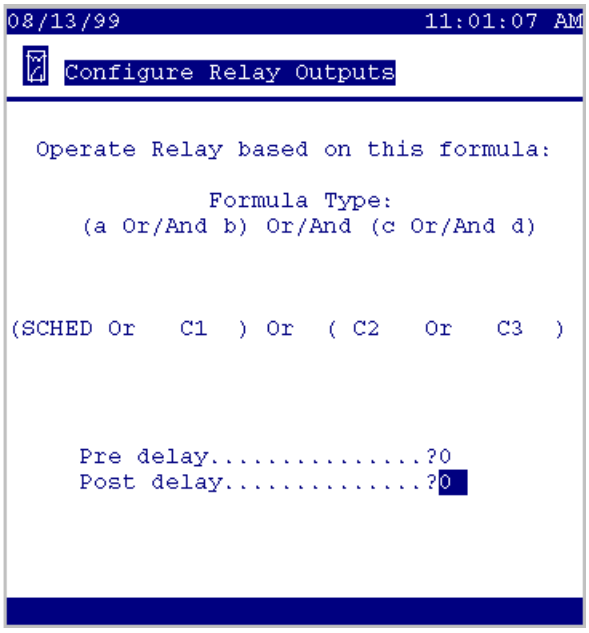


Here, it is essential that the condition be true if the input is off, because we do ***not*** want the fan to operate when a fire has been detected. Monitoring the fire strobe warning light is our indirect way of monitoring the fire alarm.

Click on **"PG DN"** and the schedule screen appears:

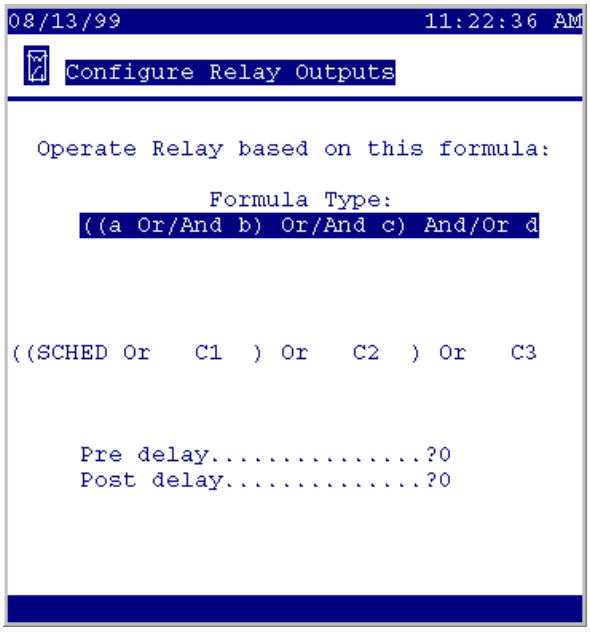
We have chosen to have our miscellaneous relay output operate on two schedules, which cover the regular bakery hours. When working outside these hours, bakery personnel will use the override switch we have installed and upon which **Condition 2** is based.

Now we proceed to the last configuration page, which looks at first like this:

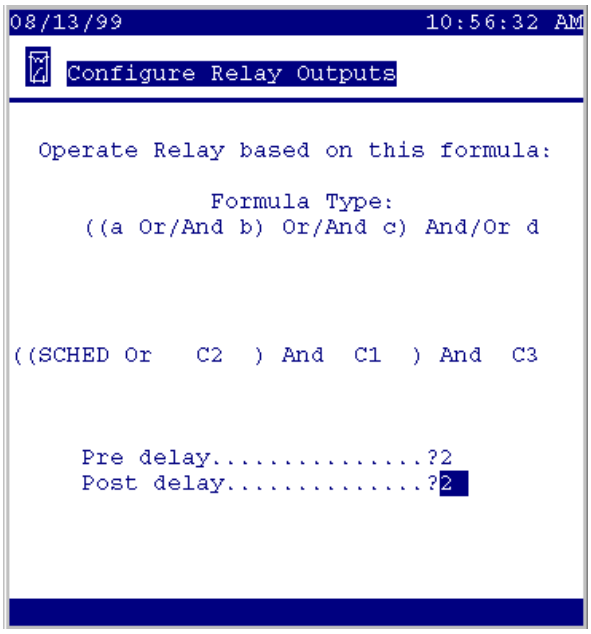

08/13/99 11:01:07 AM
Configure Relay Outputs
Operate Relay based on this formula:
Formula Type:
(a Or/And b) Or/And (c Or/And d)
(SCHED Or C1) Or (C2 Or C3)
Pre delay.....?0
Post delay.....?0

The structure of the logical formula presented will not work for us. The first part is OK if we change the **C1** to **C2**, so that the first part will be true if either the schedule is true or the override switch (**C2**) is on. But then we need to couple the part in the first parentheses with the temperature condition (**C1**) using an **And**, then join all of that to the fire strobe condition (**C3**) with an **And**. We cannot do that with the parenthesis structure given .

If we select the formula type (place the cursor anywhere in the text below **Formula Type** and click, then toggle the display, the screen will change to look like this:


08/13/99 11:22:36 AM
Configure Relay Outputs
Operate Relay based on this formula:
Formula Type:
((a Or/And b) Or/And c) And/Or d
((SCHED Or C1) Or C2) Or C3
Pre delay.....?0
Post delay.....?0

This formula type can easily be changed to serve our strategy. Making the required changes, and at the same time entering a pre and post delay, gives a finished screen looking like this:


08/13/99 10:56:32 AM
Configure Relay Outputs
Operate Relay based on this formula:
Formula Type:
((a Or/And b) Or/And c) And/Or d
((SCHED Or C2) And C1) And C3
Pre delay.....?2
Post delay.....?2

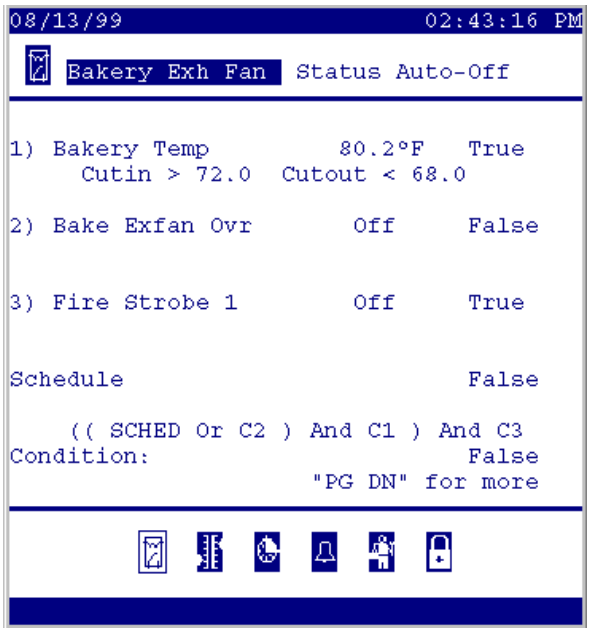
Examine the formula remembering that **C3** is true if the fire strobe input is *off*. We could state the formula in words as:

((Either scheduled hours **or** override switch on)
and Temperature in operating range)
and Fire strobe off

and the relay output will be turned on if *and only if* the formula stays true for the amount of time given as the **Pre delay**. Later, when the formula has been false for the amount of time given as the **Post delay**, the relay will be turned off.

Status Screens for Miscellaneous Points

Let's look at the status screen for the point we just created. From the Miscellaneous Points Menu, select **Relay Outputs**. A list of all the miscellaneous Relay Outputs appears. From the list, we select the name of the relay output we just configured. Now the status screen for that relay output appears:


08/13/99 02:43:16 PM
Bakery Exh Fan Status Auto-Off
1) Bakery Temp 80.2°F True
Cutin > 72.0 Cutout < 68.0
2) Bake Exfan Ovr Off False
3) Fire Strobe 1 Off True
Schedule False
((SCHED Or C2) And C1) And C3
Condition: False
"PG DN" for more

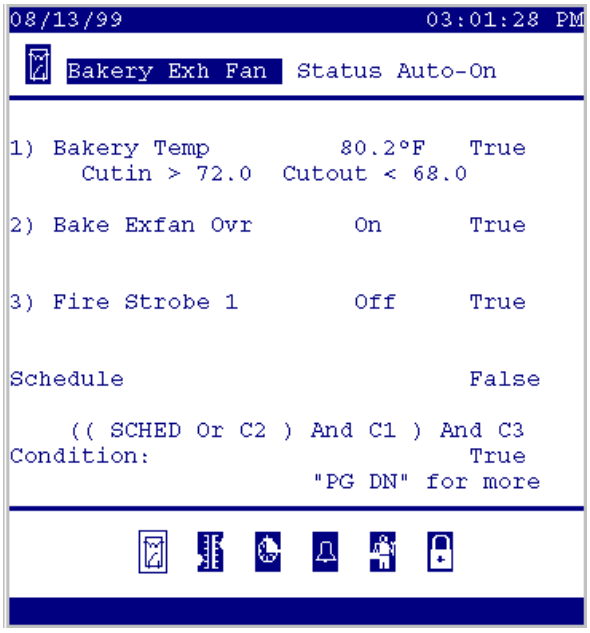
On this first page of the status screen, you can see first of all (at the head of the page, following the name of the point) that the status is **Auto-Off**. That means that the point is off due to the operation of the condition shown at the bottom of the page. The body of the page gives the truth value of each component (the three subsidiary conditions C1, C2, and C3 and the schedule) of the controlling condition. Finally, the page shows the truth value of the controlling condition.

Working through the reason that the fan is off will reinforce our understanding of how control logic is used to implement our strategy. In order for the point to be on,

1. Either the schedule must be true or the override switch must be on.
2. The temperature must be in the range calling for fan operation
3. The fire strobe must be off

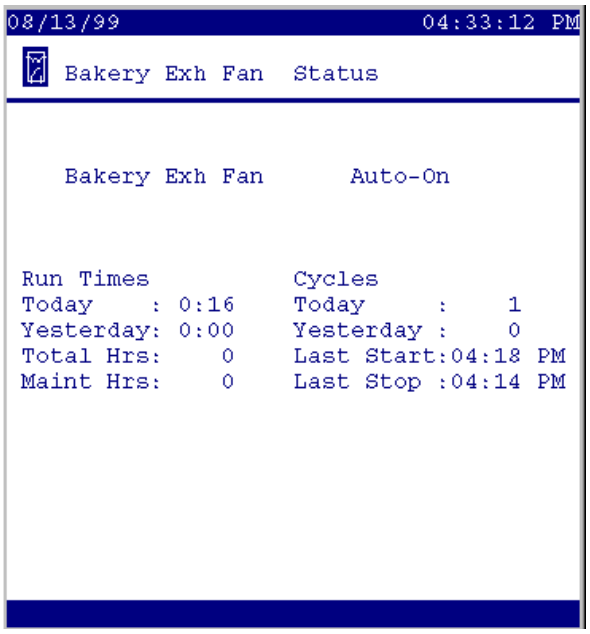
In the screen shown above, the schedule is not true, nor is the override switch on, so the subsidiary conditions depending on each of those are false. The first part of the controlling condition is not satisfied, and therefore the controlling condition is false.

The schedule is only true during the early morning hours, so we will turn on the override switch. When we do that, and after the pre-delay has elapsed, the point's status will change:


08/13/99 03:01:28 PM
Bakery Exh Fan Status Auto-On
1) Bakery Temp 80.2°F True
Cutin > 72.0 Cutout < 68.0
2) Bake Exfan Ovr On True
3) Fire Strobe 1 Off True
Schedule False
((SCHED Or C2) And C1) And C3
Condition: True
"PG DN" for more

At the bottom of the status screen is a menu of icons. From left to right these represent **Relay Output** (highlighted because it is the current screen), **Settings**, **Schedules**, **Alarms**, **Service**, and **Security**. These icons produce screens that function in the same way as screens for non-miscellaneous points (see Chapter 5).

Now the controlling condition is satisfied, as is indicated by the word **True** at the bottom right of the screen. Click on **"PG DN"** for information about the point's run time and cycling:


08/13/99 04:33:12 PM
Bakery Exh Fan Status
Bakery Exh Fan Auto-On
Run Times
Today : 0:16
Yesterday: 0:00
Total Hrs: 0
Maint Hrs: 0
Cycles
Today : 1
Yesterday : 0
Last Start:04:18 PM
Last Stop :04:14 PM

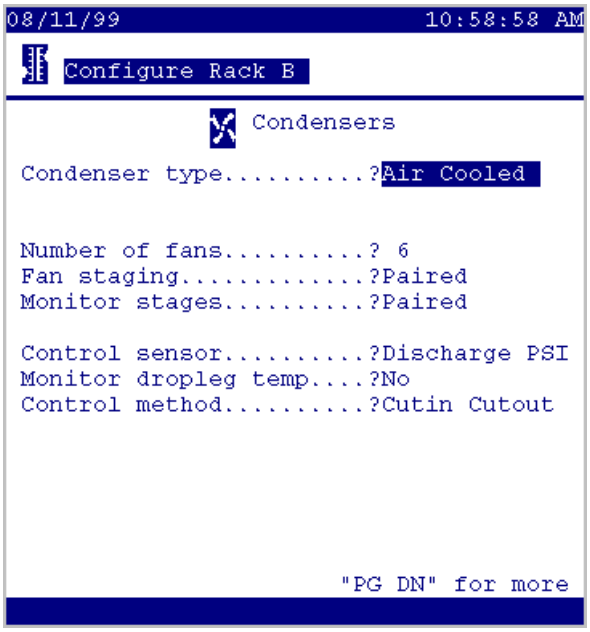
(2) Improved Condenser Control

Condenser control can take advantage of four modes of fan control:

a. cut-in and cut-out.
b. neutral zone control of fans in stages.
c. two modes of ramping control, which are used for variable speed control if VLT or VO is selected during the configuration.
   (1) individual stages (where each stage is brought on and ramped up to maximum speed, then the next stage is brought on and ramped up, and so on), or
   (2) fans all together (where stages are brought on at minimum speed one at a time and only after all stages are on is the speed ramped up).

   When an inverter is in bypass, or when neither VLT nor VO is selected, these two modes are identical and ramping is by stages. The two modes of ramping control are:

When you select Condensers from the Configure Rack Menu, then select Air Cooled in the first field, these defaults appear:



For Air Cooled condensers, the fields and their possible contents are as follows:

Condenser type — **Air Cooled**. The configuration is for an air-cooled condenser.

Number of fans — The number of fans, from **1** to **12**.

Fan staging — (Appears only if the number of fans is greater than 1) There are two possible responses:
- **Individual** — Each fan stage consists of a single fan.
- **Paired** — Each fan stage consists of a pair of fans.

Monitor stages — The mode by which the fans are monitored. There are two possible responses:
- **Individual**: Each fan is monitored. This mode of monitoring can be selected with fan staging set to either **individual** or **paired**.
- **Paired**: Fans will be monitored in pairs. This mode of monitoring can be selected only if fan staging is set to paired.
- **None**: Fans are not monitored. Fan icons on the status screen turn based on the status of their relay outputs.

Control sensor The sensor on which control is based. Only three selections are possible:

Discharge PSI

Fans will be controlled based on the pressure at the rack's discharge manifold.

Sat Cond Temp

Fans will be controlled based on saturated condensing temperature, which is the temperature equivalent to discharge pressure. Fans are cycled on and off to maintain a target saturated condensing temperature. *Note: When **Sat Cond Temp** is selected, the **target** is not user selectable, but will be equal to **outside temperature plus Condenser Delta T** (see third question below).*

If this control strategy is selected, three specific questions will appear at the bottom of the screen:

Min sat. cond temp

For proper system functioning, the saturated condensing temperature must remain above a minimum level, usually determined during design and tested during commissioning of the system. The minimum entered here (0-200 °F) establishes the minimum saturated condensing temperature target for control.

Max sat cond temp

A maximum is specified to protect the system from excessive pressures; as in the case of the minimum saturated condensing temperature, the maximum is usually determined during system design and tested during commissioning of the system. The maximum entered here (0-200 °F) establishes the maximum saturated condensing temperature target for control.

Condenser Delta T

The design temperature differential (0-25 °F) for the condenser. This value is supplied by the manufacturer of the condenser.

Dropleg Temp

Fans will be controlled based on dropleg temperature.

Control Method

Cutin Cutout

(Will only appear when **Dropleg Temp** or **Discharge PSI** is selected in the lines above as **Control sensor**) Fans will be controlled, in stages, on cut in and cut out temperatures to be set up on the next page. ***Note: It is important to click on "PG DN" and enter cut in and cut out values for each stage, since by default the stages are set to the same value.***

Target

Fans will be controlled to cycle about a target setpoint (0-500 PSI).

Target control type? There are three ways in which target control can be accomplished:

Neutral Zone

(Used only when there is no variable speed control). A band (the neutral zone) is defined about the target. Fans are not turned on or off inside the neutral zone. Fans are turned on above the neutral zone (and off below the neutral zone) depending on how long the temperature has been elevated (or depressed) and how far outside the zone the temperature is.

Ramp stages

The first fan stage is turned on at minimum speed in response to load, then the speed of the stage is ramped up to maximum. If the load requires more cooling, the next stage is brought on and the two stages are ramped up together, and so on.

Ramp together

The first fan stage is turned on at minimum speed in response to load, then the second stage is brought on at minimum speed, and so on. When all fans are running, if the cooling is not sufficient to meet the load, the speed is increased for all fans together.

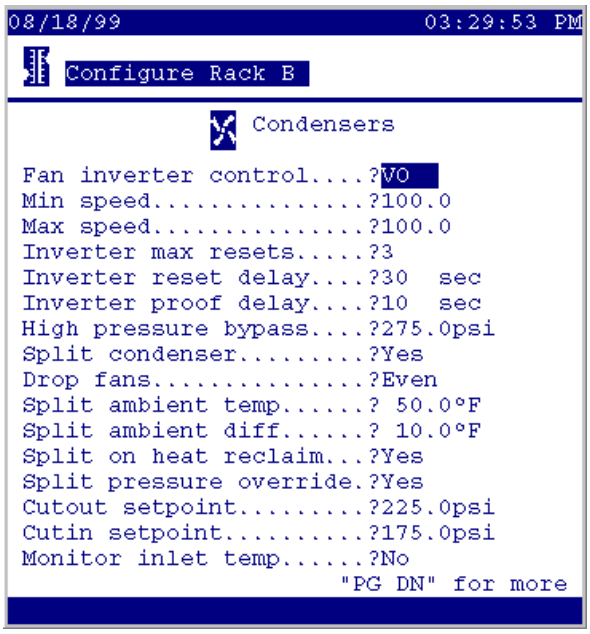
Under normal conditions, this mode produces the least objectionable noise and has the advantage of greater energy efficiency.

Monitor dropleg temp

(This question appears with all control sensor types except **Dropleg Temp**, where it is not optional, but essential.)

Target The target setpoint about which the fans are being controlled. When controlling with a dropleg temperature sensor, the target will be in degrees; when controlling with a discharge pressure sensor, the target will be in units of pressure.

When **Cutin Cutout** is selected as the control method, the second page of the condenser configuration screen allows selection of the cut-in and cut-out values. For any kind of target control, including saturated condensing temperature, the second page of the condenser configuration screen looks like this (with all possible questions shown):



The questions, with possible answers, are as follows:

Fan inverter control

None	There is no variable speed control of condenser fans. The following five questions do not appear if this answer is chosen.
VO	Fan speed will be variable, fans operated by a device controlled by an AKCESS Variable Output board (as opposed to the VLT which is directly wired to the Echelon bus).
VLT	Fan speed will be variable, fans operated by a Danfoss VLT adjustable frequency drive wired to the Echelon bus.
Min speed	The minimum speed limit, from 1-150%, for variable speed control.
Max speed	The maximum speed limit, from 1-150%, for variable speed control. This value may be more than 100 if the fan can be operated at more than 100% of rated speed. Consult the fan manufacturer's literature for further information.
Inverter max resets	The number of resets (0-10) to be allowed before the inverter is automatically switched into bypass.
Inverter reset delay	The number of seconds (from 1 to 600, default value 30) between resets.
Inverter proof delay	The elapsed time (from 1-600 seconds) without an inverter proof before a reset.
High pressure bypass	The pressure above which all fans will be turned on regardless of the operation of other control factors.

Split condenser

Yes	There is a split condenser strategy.
No	There is no split condenser strategy. The following seven questions will not appear if this answer is chosen.

Drop fans

Even	The even bank of fans will be disallowed whenever the condenser is split.
Odd	The odd bank of fans will be disallowed whenever the condenser is split.
None	All fans will remain in service when the condenser is split.

Split ambient temp	The outside ambient temperature (from 0-100 °F) at which the condenser is split and fans will be dropped.
Split ambient diff	The differential (from 0-25 °F) which when added to the split ambient temperature establishes the temperature above which the condenser will be taken out of split mode and any dropped fans will be brought back on line.

Split on heat reclaim

Yes	When heat reclaim is on, split mode will be activated automatically.
No	Split mode will not be used automatically when heat reclaim is on.

Split pressure override

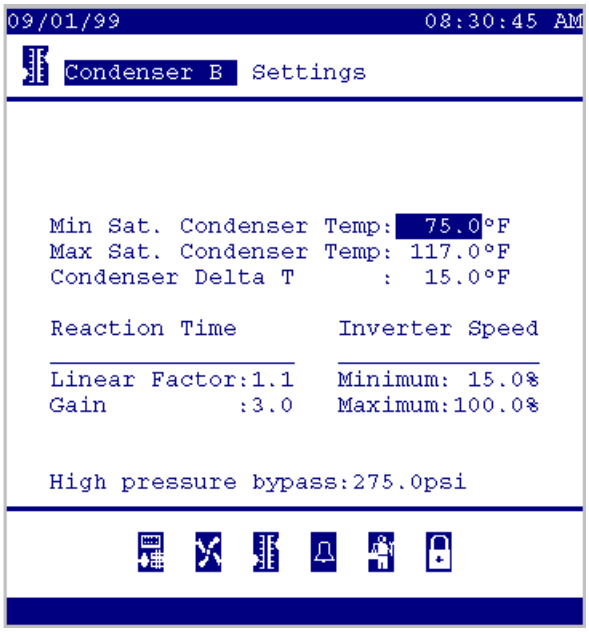
Yes	A discharge pressure above which split mode is disallowed is established. This answer will cause the cutout and cut in setpoint questions below to appear.
No	No discharge pressure limit is established for split mode.

Cutout setpoint	(Appears only if answer to “Split pressure override” question above is “Yes.”) The pressure (from 0-500 PSI) at and above which split mode is terminated.
Cutin setpoint	(Appears only if answer to “Split pressure override” question above is “Yes.”) The pressure (from 0-500 PSI) at which split mode is initiated after being cut out on override.

Monitor inlet temp

Yes	There is a temperature sensor to be monitored at the condenser inlet.
No	There is no temperature sensor to be monitored at the condenser inlet.

Use of the condenser screens, except for adjustment of parameters with the settings screen, remains the same as described in the current AKCESS System User Manual. The condenser settings screen looks like this:



Fields in the screen are as follows:

Min Sat. Condenser Temp:

For proper system functioning, the saturated condensing temperature must remain above a minimum level, usually determined during design and tested during commissioning of the system. The minimum entered here (from 0-200 °F) establishes the minimum saturated condensing temperature target for control.

Max Sat. Condenser Temp:

A maximum is specified to protect the system from excessive pressures; as in the case of the minimum saturated condensing temperature, the maximum is usually determined during system design and tested during commissioning of the system. The maximum entered (from 0-200 °F) here establishes the maximum saturated condensing temperature target for control.

Condenser Delta T:

The design temperature differential (from 0-25 °F) for the condenser. This value is supplied by the manufacturer of the condenser.

In the lower half of the screen, on the left side, are settings which govern the reaction time of the condenser control program. These settings are:

Linear Factor: The linear factor, from 1.0 to 3.0, governs the proportionality of response to changes in sensor input and is chosen based on the characteristics of the fan being controlled.

In general, the volume of air moved by a fan is not directly proportional to its speed, so that if the speed is doubled, the volume of air moved is not doubled, but is increased on the order of a factor of from approximately 1.2 to 1.4. If we know (or can determine from the manufacturer) the factor by which air volume is increased when the

fan speed is doubled, we can enter the square root of that factor as the linear factor. Otherwise, it is generally a good idea to leave the linear factor set at the default value, 2.

Gain: Gain, which can be set from 2.0 to 20.0, governs the sensitivity of the program to changes in sensor input. The higher the gain, the more rapidly changes in fan capacity are made.

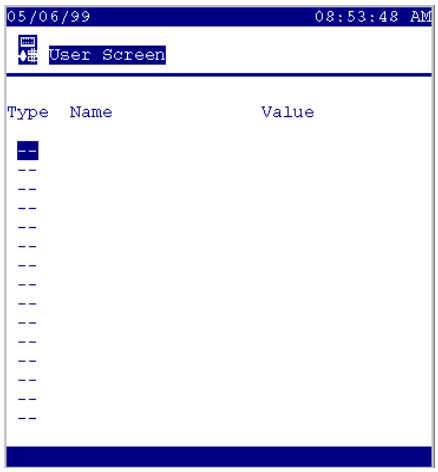
In the lower half of the screen on the right side are settings which limit inverter speed. These should be set after reference to the fan manufacturer's motor specifications.

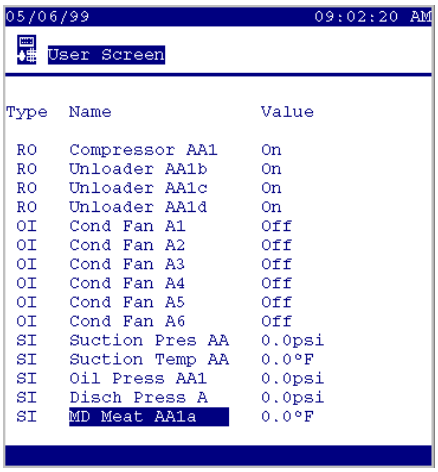
Minimum: The minimum inverter speed allowed.

Maximum: The maximum inverter speed allowed.

(3) User-configurable Screen

Users may configure a screen which will list up to 15 Relay Outputs, On/Off Inputs, Sensor Inputs, and Variable Outputs by Type, Name, and Value. The screen is configured by selecting **User Screen** from the Configure Miscellaneous menu. Click on the Type field and select the type of point you want on a line, then move to the next column, scroll through the list of points, and select the particular point by name. Then move on to the next point or exit. The blank and fully configured screens look like this:




05/06/99 09:02:20 AM
User Screen
Type Name Value
RO Compressor AA1 On
RO Unloader AA1b On
RO Unloader AA1c On
RO Unloader AA1d On
OI Cond Fan A1 Off
OI Cond Fan A2 Off
OI Cond Fan A3 Off
OI Cond Fan A4 Off
OI Cond Fan A5 Off
OI Cond Fan A6 Off
SI Suction Pres AA 0.0psi
SI Suction Temp AA 0.0°F
SI Oil Press AA1 0.0psi
SI Disch Press A 0.0psi
SI MD Meat AA1a 0.0°F

(4) Use of CPC Sensor Model CPC501-1121

With AKC 55 software versions 0.490 and higher, CPC temperature sensors type CPC501-1121 can be connected to and read by Danfoss SI8 boards. CPC sensors, Danfoss sensors, and supported sensors from ECI and Com-Trol can be mixed on a given SI8 board.

A resistor pack, available from Danfoss as part CTPKIT, must be installed on each SI8 board to which CPC sensors will be connected. The resistor is the same for CPC sensors as for ECI and Com-Trol sensors.

When configuring board and points for CPC sensors, choose type **CPC**.

AKCESS Controller Bulletins are issued to focus your attention on new Danfoss developments, which are not covered in the current manual. The information in a bulletin may be included in a future edition of the manual, or remain in bulletin form.

[For a list of current AKCESS literature, see Bulletin 1 in this series.]

To obtain literature, contact:

Danfoss Automatic Controls
7941 Corporate Drive
Baltimore, MD 21236
Telephone 410-931-8250
FAX 410-931-8256